WHAT IS CLAIMED IS

1. An assembly of a first length of pipe axially joined to a second length of pipe:

wherein said pipes each comprise an inner tubular wall having a thickness, an outer tubular wall, having a thickness, radially spaced apart from said inner tubular wall, and has a plurality of rib members disposed between said inner tubular wall and said outer tubular wall in a supporting relationship to both said walls;

wherein a portion of said first length of pipe, proximate to and including an end thereof, is configured as a single tubular wall having a thickness that is greater than the thickness of either said outer tubular wall or said inner tubular wall and having an inside diameter that is greater than the inside diameter of the remainder of said pipe;

wherein a portion of the second length of pipe, proximate to and including an end thereof, is configured as a single tubular wall having a thickness that is greater than the thickness of either said outer wall or said inner wall and having an outside diameter that is less than the outside diameter of the remainder of said pipe; and

wherein the outside diameter of the single wall portion of the second length of pipe is not larger than the inside diameter of the single wall portion of the first length of pipe.

2. An assembly as claimed in claim 1 wherein at least some of said ribs are helically oriented and define a plurality of cells each of which is bounded by two adjacent ribs and a portion of at least one of said inner tubular wall and said outer tubular wall.

3. An assembly as claimed in claim 1 wherein at least some of said ribs are slantedly joined to said inner and outer tubular walls at an angle that is not normal to a tangent to said tubular members at the point where the rib is joined to said tubular wall.

4. An assembly as claimed in claim 1 wherein said single wall portion of said second tubular wall is inserted within said single wall portion of said first tubular wall.

5. An assembly as claimed in claim 4 wherein the inside diameter of said single wall portion of said first tubular wall and the outside diameter of said single wall portion of said second tubular wall are substantially the same.

6. An assembly as claimed in claim 1 wherein said single wall portion of said inner tubular wall comprises a part of said inner tubular wall of the same length as said portion, a portion of said ribs disposed in said portion, and a part of said outer tubular wall of the same length as said portion, and wherein said outer wall portion, said inner wall portion and said ribs portion are melted together to form said single wall portion of said inner tubular wall.

7. An assembly as claimed in claim 1 wherein said single wall portion of said outer tubular wall comprises a part of said outer tubular wall of the same length as said portion, a portion of said ribs disposed in said portion, and a part of said inner tubular wall of the same length as said portion, and wherein said inner wall portion, said outer wall portion and said ribs portion are melted together to form said single wall portion of said outer tubular wall.

8. An assembly as claimed in claim 1 further comprising a gasket between at least a portion of proximate said single wall portions.

9. A length of pipe comprising an inner tubular wall, and outer tubular wall radially spaced from said inner tubular wall, and a plurality of rib members disposed between and in supporting relationship to said inner and outer tubular walls;

further comprising an end of said pipe length and a portion of said pipe proximate to said end consisting of a single wall comprising, in combination, the amount of said inner tubular wall of said portion, the amount of said outer tubular wall of said portion and the amount of rib members in said portion; and

wherein said inner tubular wall of said portion, said outer tubular wall of said portion and said rib members in said portion are consolidated together to form said single wall.

10. A length of pipe as claimed in claim 9 further comprising said end structure at both ends of said pipe.

11. A length of pipe as claimed in claim 9 wherein said single wall has an outside diameter that is substantially the same as the outside diameter of the remainder of said length of pipe.

12. A length of pipe as claimed in claim 9 wherein said single wall has an inside diameter that is substantially the same as the inside diameter of the remainder of said length of pipe.

13. A length of pipe as claimed in claim 10 wherein said single wall at one end of said pipe has an outside diameter that is substantially the same as the outside diameter of the remainder of said pipe and the single wall at the other end of said pipe has an inside diameter that is substantially the same as the inside diameter of the remainder of said pipe.

14. A length of pipe as claimed in claim 10 wherein said single walls at both ends of said pipe have inside diameters that are substantially the same as the inside diameter of the remainder of said pipe.

15. A length of pipe as claimed in claim 10 wherein said single walls at both ends of said pipe have outside diameters that are substantially the same as the outside diameter of the remainder of said pipe.

16. A method of providing half of a coupling structure at one end of a pipe, wherein said pipe comprises an inner tubular wall, and outer tubular wall radially spaced from said inner tubular wall, and a plurality of rib members disposed in supporting relationship between said inner and outer walls, which method comprises:

at least softening, into an adherent condition, a portion of said outer tubular wall comprising an end of said pipe and a portion of said outer tubular wall proximate to said pipe end

and at least softening, into an adherent condition, at least part of said rib members in said portion to form a moldable, adherent mass;

maintaining at least an inwardly directed portion of said inner tubular wall in a solid, unmoldable condition;

consolidating at least a portion of said moldable mass with said inner wall to form a consolidated single wall; and

cooling said consolidated single wall into a solidified wall having an inside diameter that is substantially the same as the inside diameter of the remainder of said pipe.

17. The method as claimed in claim 16 further comprising causing an outside diameter of said single wall to be less than the outside diameter of the remainder of said pipe.

18. The method as claimed in claim 16 further comprising causing an outside diameter of said single wall to be not more than the outside diameter of the remainder of said pipe less at least half of the thickness of the multi wall structure of said pipe.

19. The method as claimed in claim 16 further comprising at least softening said portion of said outer tubular wall and a portion of said rib members by impinging a hot fluid against them for a time sufficient to cause said melting.

20. The method as claimed in claim 16 further comprising at least softening said portion of said outer tubular wall and a portion of said rib members by subjecting them to incident radiant heating energy for a time sufficient to cause said melting.

21. The method as claimed in claim 16 further comprising at least softening said portion of said outer tubular wall and a portion of said rib members by impinging microwave energy against them for a time sufficient to cause said melting.

22. The method as claimed in claim 16 further comprising at least softening said portion of said outer tubular wall and a portion of said rib members by subjecting them to laser bombardment for a time sufficient to cause said melting.

23. The method as claimed in claim 16 further comprising at least softening said portion of said outer tubular wall and a portion of said adjacent rib members by transferring heat from an element, that is adapted to move said at least softened mass inwardly toward said inner tubular wall.

24 The method as claimed in claim 16 wherein said heating is sufficient to melt said outer wall and adjacent rib members into a molten mass.

25. A method of providing half of a coupling structure at one end of a pipe, wherein said pipe comprises an inner tubular wall, and outer tubular wall spaced from said inner tubular wall, and a plurality of rib members disposed in supporting relationship between said inner and outer walls, which method comprises:

at least softening a portion of said inner tubular wall comprising an end of said pipe and a portion of said pipe proximate to said pipe end, and at least softening at least part of said rib members in said portion of said pipe to form a softened, adherent mass;

maintaining at least an outwardly directed portion of said outer tubular wall in a solid, unsoftened condition;

consolidating at least a portion of said at least softened mass with said outer wall to form a consolidated single wall; and

cooling said consolidated single wall into a solidified wall having an outside diameter that is substantially the same as the outside diameter of the remainder of said pipe.

26. The method as claimed in claim 25 further comprising causing an inside diameter of said single wall to be greater than the inside diameter of the remainder of said pipe.

27. The method as claimed in claim 25 further comprising causing an inside diameter of said single wall to be the sum of the inside diameter of the remainder of said pipe plus about half the thickness of the multi wall structure.

28. The method as claimed in claim 25 further comprising at least softening said portion of said inner tubular wall and a portion of said rib members by impinging a hot fluid against them for a time sufficient to cause said at least softening.

29. The method as claimed in claim 25 further comprising at least softening said portion of said inner tubular wall and a portion of said rib members by subjecting them to incident radiant heating energy for a time sufficient to cause said at least melting.

30. The method as claimed in claim 25 further comprising at least softening said portion of said inner tubular wall and a portion of said rib members by impinging microwave energy against them for a time sufficient to cause said at least softening.

31. The method as claimed in claim 25 further comprising at least softening said portion of said outer tubular wall and a portion of said rib members by subjecting them to laser bombardment for a time sufficient to cause said at least softening.

32. The method as claimed in claim 25 further comprising at least softening said portion of said inner tubular wall and at least a portion of said rib members adjacent thereto by transferring heat from an element, that is adapted to move said softened mass outwardly toward said outer tubular wall.

33. The method as claimed in claim 25 wherein said heating is sufficient to melt said inner wall and said adjacent rib members into a molten mass.

34. A method as claimed in claim 16 further comprising consolidating said molten mass with said inner tubular wall by:

causing at least the inwardly directed portion of said inner tubular wall to be maintained in a solid condition;

disposing at least one roller outward of said outer tubular wall and in engaging relationship thereto;

upon forming said molten mass, engaging said roller(s) with said molten mass and causing said roller(s) to collapse said molten mass onto an outwardly directed surface of said inner tubular wall; and

cooling said molten mass while it is maintained consolidated with said inner tubular wall for a time sufficient to solidify said consolidated mass to form said single wall.

35. A method as claimed in claim 25 further comprising consolidating said molten mass with said outer tubular wall by:

causing at least the outwardly directed portion of said outer tubular wall to be maintained in a solid, unmelted condition;

disposing at least one roller inward of said inner tubular wall and in engaging relationship thereto;

engaging said roller(s) with said molten mass and causing said roller(s) to force said molten mass outwardly onto an inwardly directed surface of said outer tubular wall; and

cooling said molten mass while it is maintained consolidated with said outer tubular wall for a time sufficient to solidify said consolidated mass to form said single wall.

36. A method as claimed in claim 25 further comprising consolidating said molten mass with said outer tubular wall by:

causing at least the outwardly directed portion of said outer tubular wall to be maintained in a solid, unmelted condition;

disposing a radially expandable mandrel within said inner tubular wall and in engaging relationship thereto;

engaging said radially expandable mandrel with said molten mass and causing said mandrel to radially expand and to thereby force said molten mass onto an inwardly directed surface of said outer tubular wall; and

cooling said molten mass while it is maintained consolidated with said outer tubular wall for a time sufficient to solidify said consolidated mass to form said single wall.

37. A method as claimed in claim 25 further comprising consolidating said molten mass with said outer tubular wall by:

causing at least the outwardly directed portion of said outer tubular wall to be maintained in a solid condition;

disposing a tapered plug inside said inner tubular wall and in engaging relationship thereto;

engaging said tapered plug with said molten mass and causing said tapered plug to force said molten mass onto an inwardly directed surface of said outer tubular wall; and

cooling said molten mass while it is maintained consolidated with said outer tubular wall for a time sufficient to solidify said consolidated mass to form said single wall.

38. An apparatus, adapted to form a female portion of a coupling joint in an end of a tubular multi walled pipe, wherein said pipe comprises an outer tubular wall, and inner tubular wall radially spaced there from and a plurality of rib elements disposed between and in supporting relationship to said inner and outer tubular walls, said apparatus comprising:

a collar disposed about and in supporting relationship to an outwardly directed surface of said outer tubular wall;

a plug axially aligned with said pipe and comprising at least one shoulder structure sized and positioned to operatively engage said inner tubular wall;

heating means adapted to at least soften said inner tubular wall and adjacent rib elements proximate to the end of said pipe to form an at least softened mass, but not to soften said outwardly directed surface of said outer tubular wall and amount sufficient to distort that surface;

means to axially engage said plug with said pipe end whereby enabling said shoulder(s) to deform and collapse said at least softened mass into consolidation with said outer tubular wall and to thereby form a single wall section of said pipe including an end of said pipe and a portion of said pipe proximate to said end;

wherein said single wall section has an outer diameter that is substantially the same as the outer diameter of the remainder of said pipe and an inner diameter that is larger than the inner diameter of the remainder of said pipe; and

means to disengage said heating means and to maintain said plug, pipe end and collar in operative association for a time sufficient to enable said single wall element to solidify and to maintain its deformed position.

39. The apparatus as claimed in claim 38 wherein said heating means is at least one member selected from the group consisting of: radiant heating, resistance heating, microwave heating, laser heating and hot fluid impingement heating.

40. The apparatus as claimed in claim 38 wherein said heating means is sufficient to cause said inner tubular wall and adjacent rib elements to form a molten mass.

41. An apparatus, adapted to form a male portion of a coupling joint in an end of a tubular multi walled pipe, wherein said pipe comprises an outer tubular wall, and inner tubular wall radially spaced there from and a plurality of rib elements disposed between and in supporting relationship to said inner and outer tubular walls, said apparatus comprising:

a plug adapted to be disposed within the hollow of said pipe and in supporting relationship to an inwardly directed surface of said inner tubular wall;

an axially movable collar axially aligned with said pipe and comprising at least one shoulder structure sized and positioned to operatively engage said outer tubular wall;

heating means adapted to at least soften said outer tubular wall and adjacent rib elements proximate to the end of said pipe to form an at least softened mass, but not to deform said inwardly directed surface of said inner tubular wall;

means to axially engage said collar with said pipe end whereby enabling said shoulder(s) to deform and collapse said at least softened mass into consolidation with said inner tubular wall and to thereby form a single wall section of said pipe including an end of said pipe and a portion of said pipe proximate to said end;

wherein said single wall section has an outside diameter that is smaller than the outside diameter of the remainder of said pipe and an inside diameter that is substantially the same as the inside diameter of the remainder of said pipe; and

means to disengage said heating means and to maintain said plug, pipe end and collar in operative association for a time sufficient to enable said single wall element to solidify and to maintain its deformed position.

42. The apparatus as claimed in claim 41 wherein said heating means is at least one member selected from the group consisting of: radiant heating, resistance heating, microwave heating, laser heating and hot fluid impingement heating.

43. The apparatus as claimed in claim 41 wherein said heating means is sufficient to form said outer tubular wall and adjacent rib members into a molten mass

44. An apparatus, adapted to form a female portion of a coupling joint in an end of a tubular multi walled pipe, wherein said pipe comprises an outer tubular wall, and inner tubular wall radially spaced there from and a plurality of rib elements disposed between and in supporting relationship to said inner and outer tubular walls, said apparatus comprising:

a collar disposed about and in supporting relationship to an outwardly directed surface of said outer tubular wall;

a mandrel, having a radially outwardly expandable outer circumference, axially aligned with said pipe and disposed within the hollow of said pipe;

heating means adapted to at least soften said inner tubular wall and adjacent rib elements proximate to the end of said pipe to form an at least softened mass, but not to melt said outwardly directed surface of said outer tubular wall;

means to axially engage said mandrel with said pipe end and means to radially outwardly expand the surface of said mandrel whereby deforming and collapsing said at least softened mass into consolidation with said outer tubular wall and to thereby form a single wall section of said pipe including an end of said pipe and a portion of said pipe proximate to said end;

wherein said single wall section has an outer diameter that is substantially the same as the outer diameter of the remainder of said pipe and an inner diameter that is larger than the inner diameter of the remainder of said pipe; and

means to disengage said heating means and to maintain said mandrel, pipe and collar in operative association for a time sufficient to enable said single wall element to solidify and to maintain its deformed position.

45. The apparatus as claimed in claim 44 wherein said heating means is at least one member selected from the group consisting of: radiant heating, resistance heating, microwave heating, laser heating and hot fluid impingement heating.

46. The apparatus as claimed in claim 45 wherein said heating means is sufficient to melt said inner tubular wall and adjacent rib members into a molten mass.

47. An apparatus, adapted to form a male portion of a coupling joint in an end of a tubular multi walled pipe, wherein said pipe comprises an outer tubular wall, and inner tubular wall radially spaced there from and a plurality of rib elements disposed between and in supporting relationship to said inner and outer tubular walls, said apparatus comprising:

a plug adapted to be disposed within the hollow of said pipe and in supporting relationship to an inwardly directed surface of said inner tubular wall;

a collar, having an inwardly collapsible surface, sized and positioned to operatively engage said outer tubular wall, directed toward said outer tubular wall and axially aligned with said pipe;

heating means adapted to at least soften said outer tubular wall and adjacent rib elements proximate to the end of said pipe to form an at least softened molten mass, but not to distort said inwardly directed surface of said inner tubular wall;

means to axially engage said inwardly collapsible surface of said collar with said outer tubular wall;

means to inwardly collapse said collar, whereby deforming and collapsing said at least softened mass into consolidation with said inner tubular wall and to thereby form a single wall

section of said pipe including an end of said pipe and a portion of said pipe proximate to said end;

wherein said single wall section has an outside diameter that is smaller than the outside diameter of said pipe and an inside diameter that is substantially the same as the inside diameter of said pipe; and

means to disengage said heating means and to maintain said plug, pipe and collar in operative association for a time sufficient to enable said single wall element to solidify and to maintain its deformed position.

48. The apparatus as claimed in claim 47 wherein said heating means is adapted to melt said outer tubular wall and adjacent rib elements.

49. The apparatus as claimed in claim 47 wherein said heating means is at least one member selected from the group consisting of: radiant heating, resistance heating, microwave heating, laser heating and hot fluid impingement heating.

50. An apparatus, adapted to form a female portion of a coupling joint in an end of a tubular multi walled pipe, wherein said pipe comprises an outer tubular wall, and inner tubular wall radially spaced there from and a plurality of rib elements disposed between and in supporting relationship to said inner and outer tubular walls, said apparatus comprising:

a collar disposed about and in supporting relationship to an outwardly directed surface of said outer tubular wall;

at least one roller, having an axis that is substantially parallel to the axis of said pipe, adapted to be disposed within the hollow of said pipe and adapted to be in operative contact with said inner tubular wall;

wherein said roller(s) is adapted to exert outward pressure on said inner tubular wall;

heating means adapted to at least soften said inner tubular wall and adjacent rib elements proximate to the end of said pipe to form a molten mass, but not to deform said outwardly directed surface of said outer tubular wall;

means to rotate said pipe and said roller(s) with respect to each other;

means to engage said roller(s) with said at least softened mass and to outwardly deform and collapse said at least softened mass into consolidation with said outer tubular wall and to thereby form a single wall section of said pipe including an end of said pipe and a portion of said pipe proximate to said end;

wherein said single wall section has an outer diameter that is substantially the same as the outer diameter of the remainder of said pipe and an inner diameter that is larger than the inner diameter of the remainder of said pipe; and

means to disengage said heating means and to maintain said rotating roller(s), pipe and collar in operative association for a time sufficient to enable said single wall element to solidify and to maintain its deformed position.

51. The apparatus as claimed in claim 50 wherein said heating means is at least one member selected from the group consisting of: radiant heating, resistance heating, microwave heating, laser heating and hot fluid impingement heating.

52. The apparatus as claimed in claim 50 wherein said heating means is adapted to melt said inner tubular wall and adjacent rib elements.

53. An apparatus, adapted to form a male portion of a coupling joint in an end of a tubular multi walled pipe, wherein said pipe comprises an outer tubular wall, and inner tubular wall radially spaced there from and a plurality of rib elements disposed between and in supporting relationship to said inner and outer tubular walls, said apparatus comprising:

a plug adapted to be disposed within the hollow of said pipe and in supporting relationship to an inwardly directed surface of said inner tubular wall;

at least one roller having an axis that is substantially parallel to the axis of said pipe, adapted to be disposed in operative contact with said outer tubular wall;

heating means adapted to at least soften said outer tubular wall and adjacent rib elements proximate to the end of said pipe to form an at least softened mass, but not to distort said inwardly directed surface of said inner tubular wall;

means to rotate said pipe and said roller(s) with respect to each other;

means to engage said roller(s) with said at least softened mass whereby to force said at least softened mass inwardly and to collapse said at least softened mass and consolidate said at least softened mass with said inner tubular wall to form a single wall section of said pipe;

wherein said single wall section has an outside diameter that is smaller than the outside diameter of said pipe and an inside diameter that is substantially the same as the inside diameter of said pipe; and

means to disengage said heating means and to maintain said plug, pipe and collar in operative association for a time sufficient to enable said single wall element to solidify and to maintain its deformed position.

54. The apparatus as claimed in claim 53 wherein said heating means is sufficient to melt said outer tubular wall and adjacent rib elements.

55. The apparatus as claimed in claim 53 wherein said heating means is at least one member selected from the group consisting of: radiant heating, resistance heating, microwave heating, laser heating and hot fluid impingement heating.

56. A substantially cylindrical article comprising:

a plurality of radially disposed segments, wherein at least some of said segments are adapted to interlock with a next adjacent segment through an interwoven rabbit structure, wherein said segments are adapted to move radially with respect to the axis of said cylindrical article and in so moving collapse or expand the interlocked fingers of said rabbits whereby being adapted to decrease or increase, respectively, the effective diameter of said article;

means to heat said segments to an extent necessary to mold a thermoplastic material; and

means to mold said thermoplastic material into a shaped article by radially moving said segments while said thermoplastic material is heated to a molding temperature.

57. The cylindrical article as claimed in claim 56 wherein said cylinder is hollow.

58. The cylindrical article as a claimed in claim 56 further comprising:

said multi walls being radially spaced from each other;

means to insert said article into the interior of a multi walled plastic pipe;

means to place an outside circumference of said cylindrical article into contact with an inside circumference of said pipe;

means to heat at least an outside circumference of said cylindrical article to a temperature at which the material of said inside circumference of said pipe is moldable;

means to radially expand said cylindrical segments into contact with said inside circumference of said pipe and to thereby convert said inside circumference of said pipe into a moldable condition;

means to further radially expand said cylindrical segments whereby forcing said moldable inside circumference of said pipe radially outwardly and into contact with a radially outer wall and to join said moldable inside circumference with said outer wall to form a single wall section of said pipe.

59. The cylindrical article as a claimed in claim 56 further comprising:

said multi walls being radially spaced from each other;

means to dispose said article about the outside periphery of a multi walled plastic pipe;

means to place an inside circumference of said cylindrical article into contact with an outside circumference of said pipe;

means to heat at least an inside circumference of said cylindrical article to a temperature at which the material of the outside surface of said pipe is moldable;

means to radially contract said cylindrical segments into contact with said outside circumference of said pipe and to thereby convert said outside circumference of said pipe into a moldable condition;

means to further radially contract said cylindrical segments whereby forcing said moldable inside circumference of said pipe radially inwardly and into contact with a radially inner wall and to join said moldable outside circumference with said inner wall to form a single wall section of said pipe.

60. The cylindrical article as claimed in claim 56 further comprising means to heat at least a surface of said cylindrical sections.

61. The cylindrical article as claimed in claim 56 further comprising means to inject a fluid under pressure into the space between said interlocking rabbits; wherein said pressure is sufficient to eject foreign material disposed in said space.

62. The cylindrical article as claimed in claim 56 further comprising means to draw a vacuum from the space between said interlocking rabbits; wherein said vacuum is sufficient to suck out foreign material disposed in said space.

63. The cylindrical article as claimed in claim 56 wherein said heating is supplied by at least one member selected from the group consisting of: contact with a hot fluid; incident radiant heating, impinging microwave energy, laser bombardment, electrical resistance heating, and electrical inductance heating.